

WHAT IS CLAIMED IS:

1. An synchronization searching method of a mobile communication system, the method comprising:
 - selecting a region for an initial synchronization from an input signal; and
 - obtaining a synchronization by correlating the selected region and a synchronous code.
2. The method of claim 1, wherein the region selecting comprises:
 - respectively accumulating input signals of a channel I and a channel Q and obtaining absolute values for each;
 - adding the two absolute values; and
 - estimating a region showing a high power distribution in a power distribution of the added absolute value as a candidate region.
3. The method of claim 2, wherein accumulating is performed by a circulation buffer.
4. The method of claim 2, wherein the candidate region estimating comprises:
 - searching the region with the high power distribution from the absolute value of the input signal;
 - checking whether a length of the region corresponds to a search range; and

estimating the region as a candidate region if the length of the region with the high power distribution corresponds to the search range.

5. The method of claim 4, wherein the search range is 64 chips.

6. The method of claim 2, wherein the input signal is accumulated by according to the following equation:

$$\sum I(t\%L) = \sum Q(t\%L)$$

wherein 't' is an input sequence number, 'L' is a size of the accumulation buffer, and % indicates a remaining operator.

7. The method of claim 1, wherein the initial synchronization obtaining comprises:

obtaining a correlation value of each candidate region; and

judging that synchronization has been obtained in a corresponding candidate region if a specific correlation value is greater than a threshold value.

8. An initial synchronization method of a mobile communication system comprising:

accumulating signals I and Q and obtaining an absolute values for each signal;

combining the two absolute values;

estimating a candidate region from a power distribution of the added absolute values; and

correlating the estimated candidate region with a synchronous code to obtain initial synchronization of a terminal.

9. The method of claim 8, wherein the estimating comprises:

searching for a region with a high power distribution from the absolute value of one frame;

checking whether a length of the region with the high power distribution corresponds to a search range; and

estimating a corresponding region as a candidate region if the length of the region with the high power distribution corresponds to the search range.

10. The method of claim 9, wherein the search range is 64 chips.

11. The method of claim 8, wherein to obtain the initial synchronization comprises:

obtaining a correlation value by correlating the candidate region and a synchronous code; and

judging that synchronization has been obtained at the candidate region if the correlation value is greater than a threshold value.

12. An apparatus in a mobile communication system comprising:
- first and second accumulation buffers to respectively accumulate I and Q signals;
 - first and second absolute value calculators to obtain an absolute values from outputs of the first and second accumulation buffers;
 - an adder to add outputs of the first and second absolute value calculators;
 - an estimator to estimate a candidate region for initial synchronization from the added absolute value; and
 - a synchronization searching unit to obtain an initial synchronization of a terminal by correlating the estimated candidate region and a synchronous code.
13. The apparatus of claim 12, wherein the accumulation buffer is a circulation buffer.
14. The apparatus of claim 12, wherein the estimator configured to search a region having a high power distribution from an absolute value of one frame and estimates a region with a length of a power distribution corresponding to the search range as a candidate region.
15. The apparatus of claim 14, wherein the search range is 64 chips.

16. The apparatus of claim 12, wherein the synchronization searching unit is configured to obtain a correlation value by correlating the candidate region and a synchronous code, and if the correlation value is greater than a threshold value, the synchronization searching unit is configured to judge that synchronization has been obtained in the candidate region.

17. The apparatus of claim 12, wherein the apparatus is a base station.

18. The apparatus of claim 12, wherein the apparatus is a mobile terminal.

19. The apparatus of claim 12, wherein the apparatus comprises at least one base station and at least one mobile terminal.

20. The apparatus of claim 12, wherein the communication system is at least one of a Time Division-Synchronous Code Division Multiple Access (TD-SCDMA) communication system and a Universal Mobile Telecommunications System-Time division Duplexing (UMTS-TDD) communication system.

21. An apparatus comprising:

an estimator configured to select a region from an input signal, wherein the input signal comprises combined value of I and Q signals;

a synchronization configured to determine an initial synchronization from the region by correlating the selected region to a synchronization code.

22. The apparatus of claim 21, further comprising:

accumulation buffers and absolute value calculators configured to receive the I and Q signals and to generate absolute values for each signal; and

an adder configured to add the absolute values of the I and Q signal to generate the combined value of the I and Q signals and to convey the combined value to the estimator.

23. The apparatus of claim 22, wherein the accumulation buffers are circular buffers.

24. The apparatus of claim 23, wherein the accumulation buffers are configured to accumulate a plurality of oversampled I and Q signals, respectively.

25. The apparatus of claim 21, wherein the estimator is configured to select the region by searching the input signal and selecting a region that has a relatively high power distribution in comparison to the remaining input signal.

26. The apparatus of claim 25, wherein the estimator is configured to select the region by comparing the length of the region to a search range.

27. The apparatus of claim 26, wherein the search range is 64 bits.
28. The apparatus of claim 21, wherein the apparatus is at least one of a base station and a mobile terminal.
29. The apparatus of claim 21, wherein is a mobile communication system.
30. The apparatus of claim 29, wherein the mobile communication system is at least one of a Time Division-Synchronous Code Division Multiple Access (TD-SCDMA) communication system and a Universal Mobile Telecommunications System-Time division Duplexing (UMTS-TDD) communication system.